

WHAT IS CLAIMED IS:

1. A card authenticity judging apparatus comprising:

5 a light projecting system for projecting laser measurement light toward hologram that is provided on a surface of a card and on which an image on the basis of grating pattern is formed;

a Fourier transform lens for forming grating pattern image on the basis of reflected diffraction luminous flux of being reflected from said hologram on its light receiving section; and

10 judging means for judging authenticity of said card on the basis of photoelectric output from said light receiving section.

2. The card authenticity judging apparatus as claimed in claim 1, wherein said judging means is provided with a display section for displaying its judgment result.

15 3. The card authenticity judging apparatus as claimed in claim 1 or claim 2, wherein said judging means judges authenticity of said card on the basis of analysis result from an analysis section that analyzes grating pattern image.

20 4. The card authenticity judging apparatus as claimed in claim 3, wherein said analysis section outputs its analysis result to said judging means while analyzing formation position of grating pattern image, peak intensity, and spread width.

25 5. The card authenticity judging apparatus as claimed in claim 4, wherein said judging means, when all of formation position of grating pattern image, peak intensity, and spread width are authentic, judges the card to be authentic card and displays the effect of being authentic card on said display section.

6. The card authenticity judging apparatus as claimed in claim 4, wherein said judging means, when any one or more from among formation

position of grating pattern image, peak intensity, and spread width is camouflage, judges the card to be camouflage card and displays the effect of being camouflage card on said display section.

7. The card authenticity judging apparatus as claimed in claim 4,  
5 wherein said judging means, when all of formation position of grating pattern image, peak intensity, and spread width is authentic, judges the card to be authentic card, when any one thereof is pseudo within predetermined analysis limit, judges the card to be temporarily authentic card, and when any one or more thereof is camouflage, judges the card to be pseudo card, displays the judgment  
10 result on said display section.

8. The card authenticity judging apparatus as claimed in claim 4, wherein said judging means, when plural kinds of pitches or directions of grating pattern exist, judges by using analysis result from one of them or from the whole.

9. A card authenticity judging apparatus comprising:  
15 a light projecting system for projecting laser measurement light toward a hologram which is provided on a card surface and on which an image is formed on the basis of grating pattern;

a light receiving system for receiving grating pattern image on the basis of reflected diffraction light of being reflected from said hologram and regularly  
20 reflected image due to regularly reflected luminous flux of being regularly reflected from the hologram; and

judging means for judging authenticity of said card on the basis of both said grating pattern image and said regularly reflected image.

10. The card authenticity judging apparatus as claimed in claim 9,  
25 wherein said light receiving system has one light receiving section that receives both said grating pattern image and said regular reflected image with common use condition.

11. The card authenticity judging apparatus as claimed in claim 10, wherein said light receiving system has one Fourier transform lens which is provided for the sake of common use of causing said light receiving section to receive both said grating pattern image and said regular reflected image.

5 12. The card authenticity judging apparatus as claimed in any one of claim 9 to claim 11, wherein said judging means is provided with a display section for displaying judgment result.

10 13. The card authenticity judging apparatus as claimed in any one of claim 9 to claim 12, wherein said judging means judges authenticity of said card on the basis of photoelectric output from an analysis section of outputting both analysis results concerning formation position of grating pattern image, peak intensity, and spread width as well as analysis results concerning light receiving position of regular reflected image and spread width.

15 14. The card authenticity judging apparatus as claimed in claim 13, wherein said judging means, when all of analysis results concerning formation position of grating pattern image of being analyzed at said analysis section, peak intensity, and spread width fall within permitted limit, judges the card to be authentic card and displays the effect of being authentic card on said display section.

20 15. The card authenticity judging apparatus as claimed in claim 13, said judging means, when any one or more of analysis results concerning formation position of grating pattern image of being analyzed at said analysis section, peak intensity, and spread width does not fall within permitted limit, judges the card to be counterfeit card and displays the effect of being counterfeit card on said display  
25 section.

16. The card authenticity judging apparatus as claimed in claim 13, wherein said judging means, when all of analysis results concerning formation

position of grating pattern image of being analyzed at said analysis section, peak intensity, and spread width is authentic, judges the card to be authentic card, when any one thereof falls within predetermined limit deviated from permitted limit, judges the card to be temporarily authentic card, and when any one or more  
5 thereof does not fall within the predetermined limit, judges the card to be pseudo card, and displays the judgment result on said display section.

17. The card authenticity judging apparatus as claimed in any one of claim 14 to claim 16, wherein said judging means, when obtaining analysis result in which light receiving position of regular reflected image shifts from normal  
10 position, judges analysis result of grating pattern image in consideration of the analysis result.

18. The card authenticity judging apparatus as claimed in any one of claim 14 to claim 16, wherein said judging means, when obtaining analysis result in which spread width of regular reflected image is wider than formal width,  
15 judges analysis result of grating pattern image in consideration of the analysis result.

19. The card authenticity judging apparatus as claimed in any one of claim 9 to claim 18, wherein said judging means, when plural kinds of pitches or plural kinds of directions of grating pattern exist, judges the card by using one of  
20 them or by using a plurality of analysis results.

20. A card authenticity judging apparatus comprising:

a light projecting system for projecting measurement light toward hologram which is provided on a card and on which an image on the basis of grating pattern is formed; and

25 a light receiving system for detecting reflected diffraction light of being reflected from said hologram,

wherein, in order to judge whether the card is authentic card or

counterfeit card, there is provided an incident direction changing means for changing incident direction of said measurement light toward said hologram.

21. The card authenticity judging apparatus as claimed in claim 20, wherein said incident direction changing means changes incident direction to  
5 hologram depending on kinds of cards.

22. The card authenticity judging apparatus as claimed in claim 20 or claim 21, further comprising:

a judging means for judging authenticity of said card while analyzing respective reflected diffraction lights obtained in such a way as to change incident  
10 direction of said measurement light to said hologram.

23. The card authenticity judging apparatus as claimed in claim 20 or claim 21, wherein said light receiving system is made up of a line sensor for receiving said reflected diffraction light, and a Fourier transform lens that is put between the line sensor and said card.

24. The card authenticity judging apparatus as claimed in claim 20 or claim 21, wherein said light projecting system is provided with a plurality of laser light sources, said incident direction changing means is a lighting/putting-out-lights switch for causing said respective laser light sources to be subjected to lighting/putting-out-lights.  
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25. The card authenticity judging apparatus as claimed in claim 20 or claim 21, wherein said light projecting system is provided with a laser light source and a revolving means for revolving the laser light source to said card, and said incident direction changing means is composed of said revolving means.  
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26. The card authenticity judging apparatus as claimed in claim 20 or claim 21, wherein said incident direction changing means is a revolving means for revolving the card with said card supported.  
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27. The card authenticity judging apparatus as claimed in claim 22,

wherein said judging means changes its allowed value of authenticity judgment of said card accompanying with change of incident direction of said measurement light.

28. A card authenticity judging apparatus comprising:

5 a light projecting system for projecting measurement light toward hologram which is provided on a card and on which a plurality of images on the basis of a plurality of grating patterns are formed;

10 a light receiving system having a line sensor for detecting a plurality of reflected diffraction lights of being subjected to reflection and diffraction due to said grating pattern; and

judging means for judging whether said card is authentic card or counterfeit card while analyzing photoelectric output on the basis of said respective reflected diffraction lights of said line sensor.

15 29. The card authenticity judging apparatus as claimed in claim 28, wherein arrangement formation direction of said plurality of reflected diffraction light is the same direction as extending direction of said line sensor.

30. The card authenticity judging apparatus as claimed in claim 28, wherein arrangement formation direction of said plurality of reflected diffraction lights is direction perpendicular to extending direction of said line sensor.

20 31. The card authenticity judging apparatus as claimed in claim 28, wherein said light projecting system consists of one laser light source.

32. The card authenticity judging apparatus as claimed in claim 28, wherein said light receiving system has a Fourier transform lens that is put between said line sensor and said card.

25 33. A card authenticity judging apparatus comprising:

a light projecting system for projecting measurement light toward hologram which is provided on a card and on which a plurality of images on the

basis of grating pattern whose arrangement formation direction of diffraction grating is different are formed;

a light receiving system having a plurality of line sensors for detecting respective reflected diffraction lights of being subjected to reflection and diffraction  
5 due to said respective diffraction grating; and

judging means for judging whether the card is authentic card or counterfeit card while analyzing photoelectric output on the basis of said respective reflected diffraction lights of said respective line sensors.

34. The card authenticity judging apparatus as claimed in claim 33,  
10 wherein said light receiving system has a Fourier transform lens that is put between said line sensor and said card.

35. A card authenticity judging system comprising:

an apparatus body that is provided with an optical system whose light receiving section receives grating pattern image of laser measurement light of  
15 being projected toward hologram which is provided on a surface of a card and on which an image on the basis of grating pattern is formed; and  
a server of storing therein allowed reference value for judging authenticity of said card on the basis of grating pattern image,

wherein, in order to judge authenticity of card while comparing  
20 photoelectric output concerning said grating pattern image with the allowed reference value of being stored in said server, said apparatus body is made to connect to said server through a telecommunication line.

36. The card authenticity judging system as claimed in claim 35,  
wherein said optical system is provided with a Fourier transform lens for causing  
25 grating pattern image to be received by said light receiving section.

37. The card authenticity judging system as claimed in claim 35 or claim 36, wherein said apparatus body is provided with a display section for displaying

judgment result.

38. The card authenticity judging system as claimed in any one of claim 35 to claim 37, wherein said server is provided with an analysis section for receiving to analyze photoelectric output of grating pattern image transmitted from said light receiving section, and a judging means for conducting authenticity judgment based on both analysis result by the analysis section and allowed reference value of being stored in said server, then, said server transmits the judgment result to said apparatus body.

39. The card authenticity judging system as claimed in any one of claim 35 to claim 37, wherein said apparatus body is provided with an analysis section for receiving to analyze photoelectric output of grating pattern image transmitted from said light receiving section and for transmitting the analysis result to said server, and said server is provided with a judging means for judging authenticity of said card based on both analysis result transmitted from said analysis section and allowed reference value of being stored in said server, and for transmitting the judgment result to said apparatus body.

40. The card authenticity judging system as claimed in any one of claim 35 to claim 37, wherein said apparatus body is provided with an analysis section for receiving to analyze photoelectric output of grating pattern image transmitted from said light receiving section, and a judging means for conducting authenticity judgment based on both allowed reference value received from said server and analysis result of said analysis section.

41. The card authenticity judging system as claimed in any one of claim 38 to claim 40, wherein said analysis section outputs analysis result concerning formation position of grating pattern image, peak intensity, spread width to said judging means.

42. The card authenticity judging system as claimed in claim 41,



wherein said judging means, when all of analysis results concerning formation position of grating pattern image analyzed by said analysis section, peak intensity, spread width falls within permitted limit, judges the card to be authentic card.

43. The card authenticity judging system as claimed in claim 39,  
5 wherein said judging means, when all of analysis results concerning formation position of grating pattern image of being analyzed at said analysis section, peak intensity, and spread width is authentic, judges the card to be authentic card, when any one thereof falls within predetermined limit deviated from permitted limit, judges the card to be temporarily authentic card, and when any one or more  
10 thereof does not fall within the predetermined limit, judges the card to be pseudo card.

44. The card authenticity judging system as claimed in any one of claim 38 to claim 43, wherein said judging means, when plural kinds of pitches or plural kinds of directions of grating pattern exist, judges the card by using one of them or  
15 by using a plurality of analysis results.